Title: AN IMPROVED OPEN-ANGLE SEAT FOR A CHAIR

FIELD OF THE INVENTION

This invention relates to open-angle seats for chairs.

BACKGROUND OF THE INVENTION

The natural upright curvature of a human spine is found when a person stands. While standing the psoas major muscle pulls on the lumbar vertebrae of the lower back to help define the standing posture. When a person sits in a classic right angle position—with the thighs at roughly a 90° angle to the trunk of the body—the psoas major muscle relaxes and no longer pulls on the lumbar vertebrae. Further, the hamstring muscles located at the back of the thighs pull on the pelvis, causing it to rotate backwardly. This results in the spine becoming rounded. In order to restore an upright curvature to the spine, the lumbar muscles of the lower back work to push the pelvis forward to counteract the pull by the hamstring muscles. Eventually, the lumbar muscles tire. The hamstring muscles rotate the pelvis backwards, and the spine becomes rounded once again. This posture, typically referred to as slouching, becomes a posture of choice simply because it requires the least amount of muscular effort. After several years of sitting at a desk or working at a computer, the sitting posture worsens and can result in other problems, such as rounded shoulders, pressure on abdominal organs, extension of the neck, and lower back pain. In some instances, serious chronic injury can result. It has therefore been recognized that there is a need for a seat that restores the natural upright curvature to the spine when a person sits.

Research has identified a relationship between a person's thighs and spine, which led to the creation of an open-angle chair. Open-angle chairs allow the thighs to drop creating an angle with the trunk of the body that is greater than 90°. This results in positive biomechanical changes in spinal and pelvic posture. In particular, the hamstring muscles no longer pull on the pelvis, allowing it to roll forward, and the psoas major

muscle no longer completely relaxes, and so maintains some of its pull on the lumbar vertebrae. The interaction of these muscles allows the spine to maintain a natural upright curvature.

One type of open-angle chair is the saddle seat (see, for example, U. S. patent Nos. 3,754,787 and 4,607,882), which was inspired by horseback riding. A straddling position allows the thighs to drop yet provides support to the inner surface of the thighs that adds stability to the sitting posture. Saddle seats, however, provide no weight bearing support under the thighs so that the full load of the trunk of the body is concentrated on the two sit bones (ischial tuberosities) which, over time, can be painful. Saddle seats also cause the legs to spread excessively, which, over time, can cause numbness and discomfort to the inner thighs. Further, for many people, saddle seats are difficult to get in and out of.

Other forms of open-angle chairs generally involve tilting the seat, as found in, for example, U. S. patent Nos. 4,552,404 and 4,960,305. Tilted seats provide for some weight bearing support under the buttocks and thighs of a person, and the legs are not spread so no numbness or discomfort to the inner thighs results from prolonged sitting. Tilted seats, however, have the problem that the trunk of the body slides forward under gravity and this downward force must be counteracted by muscle activity in the legs and feet. Over time, this can result in increased fatigue and discomfort. Kneeling chairs are variations of the tilt seat and have the addition of a cushion provided below the knees to redirect the downward pressure caused by gravity from the legs and feet to the shins of a person. Kneeling chairs, for many people, are difficult to get in and out of.

It is also known that perching (sitting at the forward edge of a seat of a chair) offers biomechanical advantages to sitting posture. The angle between the spine and the thighs in perching is similar to horseback riding and similar to saddle chairs. Chairs that utilize the advantages of perching (see, for example, U. S. patent No. 5,253,922, which combines perching with certain elements of a saddle seat) are generally higher than conventional chairs, but suffer from similar problems as tilted seats in that most of the support is provided by the feet.

Furthermore, perching provides no weight bearing support under the thighs so that the load of the trunk of the body is concentrated on the sit bones.

Accordingly, there is a need for a seat for a chair that provides independent support surfaces to the sit bones and the thighs, but also provides the open-angle benefits to the spine as described above.

SUMMARY OF THE INVENTION

This invention relates to an improved open-angle seat, and, in particular, a chair that uses the improved open-angle seat of this invention. The improved seat of this invention provides independent support to both a person's sit bones (ischial tuberosities) and thighs. In particular, the seat comprises a first support surface to support the downward load of a person's trunk at the sit bones, when the first support surface is disposed in a first plane. The seat also has a second support surface to support a person's thighs. The second support surface is disposed substantially forwardly of the first support surface in a second plane angled downwardly in relation to the first plane.

More particularly, the seat comprises a first support surface, with the first support surface being substantially planar and adapted to support a person seated on the seat at the sit bones. A second support surface is also provided, with the second support surface being substantially planar and adapted to support the person seated on the seat at the thighs. The plane of the first support surface and the plane of the second support surface intersect so that when the first support surface is substantially horizontal, the second support surface extends substantially forwardly and downwardly with respect to the first support surface.

In the preferred embodiment the first support surface is a substantially planar surface having a perimetrical extent sufficient to extend under a person's buttocks to support the sit bones. Moreover, in the preferred embodiment the second support surface is a substantially planar surface having a perimetrical extent sufficient to extend under and support a person's thighs.

The second support surface preferably extends under a person's thighs a distance sufficient to support the thighs, but less than the extent of a person's thighs from the hips to the knees. In particular, the second support surface has a forward facing edge and the front-to-back length of the second support surface is such that the forward facing edge is located just before a person's knees. This allows a person sitting on a seat of this invention to bend the knees. For an average person this length is equal to the length of the hand, measured from wrist to the end of the middle finger. Measuring the hand as described provides a relatively easy and accurate way to determine the front-to-back length for the second support surface. It is generally difficult to obtain a direct measurement of this length from the thighs of a person since it is usually difficult to determine where, at the top of the legs of a typical person, the thighs begin.

It is preferable that the second support surface is angled downwardly in relation to the first support surface by an angle ranging from about 10° to about 30°, and, in the preferred embodiment, by an angle of about 20°.

The first support surface of the seat is preferably disposed in a plane that is substantially horizontal and at a height above a floor the lesser of:

a.) substantially 1/3 of a person's standing height; and

b.) the length of a person's legs measured from the floor to a height slightly above the knees.

Further, the preferred embodiment of this invention has the first support surface and the second support surface joined along a common edge. The common edge has a rounded profile which, in the preferred embodiment, is about 12 cm. radius.

In one alternative embodiment of the seat, a pommel is provided to support the inner surface of the thighs and enhance lateral stability when a person sits, particularly when the person reaches or shifts positions. The pommel extends upwardly from the support surfaces.

This invention also provides for a method of constructing a chair for a specific person with a seat that provides independent support to both the person's sit bones and thighs, as described above. The method particularly comprises obtaining certain measurements from the person and using those measurements to select and arrange the support surfaces in the chair. The measurements include:

a.) obtaining a measurement for the height of the first support surface above a floor so a person can sit in the chair with the feet resting on the floor and the second support surface providing independent support to the thighs; and

b.) obtaining a measurement for the front-to-back length of the second support surface so that a forward facing edge of such support surface is located just before a person's knees.

These measurements are used to select and arrange the support surfaces in the chair including:

I.) arranging the first support surface in the chair at the height determined in step a.) above with the first support surface disposed in a first plane; and

II.) arranging the second support surface having a front-to-back length determined from step b.) above in the chair substantially forwardly of the first support surface in a second plane angled downwardly in relation to the first plane.

In the preferred method of the invention the measurement obtained from step a.) above is a measurement from the person which is the lesser of:

i.) substantially 1/3 of a person's standing height; and

ii.) the length of a person's legs measured from the floor to a height slightly above the knees

In the preferred method of the invention the measurement obtained from step b.) above is a measurement of the length of a hand of the person as measured from the wrist to the end of the middle finger. Measuring the hand as described provides a relatively easy and accurate

way to determine the front-to-back length for the second support surface. It is generally difficult to obtain a direct measurement of this length from the thighs of a person since it is usually difficult to determine where, at the top of the legs of a typical person, the thighs begin.

In the preferred method of the invention, step II.) above further comprises angling second support surface downwardly in relation to the first support surface by an angle ranging from about 10° to about 30°, and preferably by an angle of about 20°.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

For a better understanding of the present invention and to show more clearly how it would be carried into effect, reference will now be made, by way of example, to the accompanying drawings that show preferred embodiments of the present invention, and in which:

Figure 1 is a side view of a person in a standing position;

Figure 2 is a side view of person sitting in a conventional right angle position;

Figure 3 is a side view of a person sitting in a conventional saddle seat;

Figure 4 is a side view of a person sitting in a conventional tilt seat;

Figure 5 is a side view of a person sitting in a conventional kneeling chair;

Figure 6 is a side view of a person perching on a chair;

Figure 7 is a side view of a person sitting on the improved seat of this invention;

Figure 8 is a perspective view of the improved seat of this invention;

Figure 9 is a side view of the improved seat of this invention illustrated in Figure 8;

Figure 10 is a perspective view of a typical chair constructed with the improved seat of this invention;

Figure 11 is a perspective view of an alternative embodiment of the improved seat of this invention;

Figure 12 is a side view of the alternative embodiment of the improved seat of this invention illustrated in Figure 11;

Figures 13–16 are perspective views of various alternative embodiments of the improved seat of this invention;

Figure 17 is a perspective view of the improved seat of this invention including a pommel;

Figure 18 is a side view of the improved seat illustrated in Figure 17;

Figure 19 is a top view of the improved seat illustrated in Figure 17;

Figure 20 is a front view of the improved seat illustrated in Figure 17 showing a person seated on the seat; and

Figures 21–26 are perspective and side views, respectively, of alternative embodiments of the pommel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows a typical person 10 standing in an upright position. The standing posture illustrates the natural upright curvature of the spine 12. In this position the psoas major muscle 14 pulls on the lumbar vertebrae 16 of spine 12 giving the spine its natural upright curvature. The psoas major muscle 14 extends from the thigh bone 18 to the lumbar vertebrae 16 of the spine 12.

In a classic right angle sitting position, illustrated in Figure 2, person 10 sits on a seat 20 with thighs 22 at roughly a 90° angle to the trunk 24 of the body. This relaxes the psoas major muscle 14 so that it no longer pulls on the lumbar vertebrae 16 of the spine 12. In general, after 60° of bending the hamstring muscles 26 tend to pull the pelvis 28 in the direction of arrow 30 which causes the pelvis 28 to rotate backwards, as indicated by arrow 32, and as illustrated in Figure 2. This causes the spine to become rounded. To restore an upright curvature to the spine the lumbar muscles of a person's lower back (not illustrated) work to push the

pelvis 28 forward to counteract the pull of the hamstring muscles 26. Over time the lumbar muscles get tired, and eventually stop pushing. This results in the spine becoming rounded once again and a slouching posture, as illustrated in Figure 2, becomes a position of choice since it requires the least amount of muscular effort.

A biomechanical relationship has been identified between a person's thighs and spine, which has led to the creation of an open-angle seat. Open-angle seats allow the thighs 22 to drop creating an angle with the trunk 24 of the body that is greater than 90°. This results in positive biomechanical changes in spinal and pelvic posture. In particular, the hamstring muscles 26 no longer pull on the pelvis 28, allowing it to roll forward, and the psoas major muscle 14 no longer completely relaxes, and so maintains some of its pull on the lumbar vertebrae 16. The interaction of these muscles allows the spine 12 to maintain its natural upright curvature. There are a variety of chairs in the marketplace that utilize open-angle seats, for example, a saddle seat (illustrated in Figure 3), a tilt chair (illustrated in Figure 4), a kneeling chair (illustrated in Figure 5), and a perch (illustrated in Figure 6). These chairs all provide the biomechanical relationship identified above, and are known to those skilled in the art as open-angle chairs.

One type of conventional open-angle chair is the saddle seat 34 illustrated in Figure 3. Saddle seats allow the thighs 22 to drop into an open-angle position creating an angle with the trunk 24 of the body that is greater than 90°, thereby maintaining the natural upright curvature of the spine 12, as described above. Legs 36 of person 10 straddle the seat 34 so that support is provided by a surface 38 of the saddle seat 34 to the inner surface of the thighs 22 (not illustrated). This adds stability to the sitting posture, but, over time, can cause numbness and discomfort to the inner thighs. Moreover, there is no weight bearing support surface provided under the thighs 22. Rather, the full downward load of the trunk 24 of person 10 is carried by a support surface 40 of the saddle seat 34 and is concentrated on the sit bones (ischial tuberosities) 42 of person 10, as illustrated in Figure 3. Over time this can be painful.

Figure 4 illustrates a conventional tilt seat 44, and Figure 5 shows a variation of the tilt seat, namely, a kneeling chair 46. Both seats allow the thighs 22 to drop into an open-angle position creating an angle with the trunk 24 of the body that is greater than 90°, thereby maintaining the natural upright curvature of the spine 12, as described above. Tilt seat 44, as illustrated in Figure 4, includes a single support surface 48 that provides some weight bearing support under both the sit bones 42 and the thighs 22. As can be appreciated from Figure 4, however, the trunk 24 of person 10 tends to slide under gravity downwardly and forwardly over the support surface 48—as indicated by arrow 50. This downward and forward motion must be counteracted by muscle activity from both the legs 36 and the feet 52 of person 10. Over time, this can result in fatigue and discomfort for a person.

Kneeling chair 46, illustrated in Figure 5, is similar to the tilt seat 44, illustrated in Figure 4, but includes the addition of a support surface 54 (usually cushioned) provided below the knees 56 of person 10 to redirect the downward pressure caused by gravity acting on the trunk 24 from the legs 36 and the feet 52 (as shown for the tilt seat 44 in Figure 4) to the shins 58. The downward pressure caused by gravity must still be counteracted by muscle activity from the legs 36, however, which can result in fatigue and discomfort to a person over time.

It is also known that perching (sitting at the forward edge of a seat of a chair) as shown in Figure 6 offers biomechanical advantages to the sitting posture. When the chair is high enough, perching allows the thighs 22 to drop into an open-angle position creating an angle with the trunk 24 of the body that is greater than 90°, thereby maintaining the natural upright curvature of the spine 12, as described above. Figure 6 shows a person 10 sitting at the forward edge of a seat 60 provided at a sufficient height above a floor to allow the thighs 22 to drop into an open-angle position. In effect, perching is the act of a person 10 bracing himself from falling off the forward edge of the seat 60 by using the muscles of both the legs 36 and the feet 52. Over time, this can result in increased fatigue and discomfort for the person. Further, perching provides no weight

bearing support under the thighs 22, so that the load of the trunk of the body is concentrated on the sit bones 42.

The open-angle seat 62 of this invention is illustrated in Figures 7 and 8, and provides independent support surfaces for the sit bones (ischial tuberosities) 42 and also for the thighs 22 of person 10, yet allows the thighs 22 to drop into an open-angle position creating an angle with the trunk 24 of the body that is greater than 90°, thereby maintaining the natural upright curvature of the spine 12, as described above.

In particular, the open-angle seat 62 of this invention includes a first support surface 64 that has a sufficient perimetrical extent to extend under a person's buttocks 66 to support the downward load of the trunk 24 at the sit bones 42, as illustrated in Figure 7. In particular, the first support surface 64 extends substantially in a plane 68. In the preferred embodiment illustrated plane 68 is disposed substantially parallel to a plane defined by where the chair rests upon a surface 70. Therefore, in normal usage with the chair on a substantially horizontal surface 70, such as a floor, plane 68 is disposed substantially horizontal. This allows the seat 62 of this invention to support from below the downward load of the trunk 24 of the body at the sit bones 42. It can be appreciated, however, that plane 68 can vary from the horizontal so long as the trunk 24 of person 10 does not slide under gravity downwardly and forwardly over the support surface as in a tilt chair illustrated in, for example, Figure 4. Further, it can be appreciated that the first support surface 64 can be a single support surface (as illustrated in Figure 8) or a plurality of support surfaces disposed in plane 68.

The seat 62 of this invention also includes a second support surface 72 having a sufficient extent to extend under and support the person's thighs 22, as illustrated in Figure 7. In the preferred embodiment of this invention, the second support surface 72 extends substantially in a plane 74 and has a perimetrical extent sufficient to extend under and support the thighs 22 of person 10. To position the thighs 22 in an open-angle position creating an angle with the trunk 24 of the body that is greater than 90°, the plane 74 is disposed substantially forwardly and

downwardly in relation to the plane 68, as illustrated in Figures 7 and 9. It is found that desirable open-angle benefits can be achieved by angling the substantially planar extent of the second support surface 72 downwardly in relation to the substantially planar extent of the first support surface 64 by an amount ranging from about 10° to about 30°. In the preferred embodiment, the substantially planar extent of the second support surface 72 is angled downwardly in relation to the substantially planar extent of the first support surface 64 by an angle of about 20°. It can be appreciated that the second support surface 72 can be a single supporting surface (as illustrated in Figure 8) or a plurality of support surfaces (see, for example, Figure 13) disposed under a person's thighs 22 in plane 74.

The front-to-back extent of the second support surface 72 should be sufficient to support the thighs 22, but not so long as to interfere with the bending of the legs 36 of person 10 at the knees 56. In general, a forward facing edge 76 of the second support surface 72 is located just behind the knees 56, as illustrated in Figure 7. For an average person, the front-to-back length A, as shown in Figure 7, of the second support surface 72 is substantially equal to the length of a hand 78 of the person 10 as measured from the wrist to the end of the middle finger. This measurement is shown in Figure 1 at A. Measuring the hand 78 as described provides a relatively easy and accurate way to determine the front-to-back length of the second support surface 72. It is generally difficult to obtain a direct measurement of this length from the thighs 22 of the person 10, since it is usually difficult to determine where, at the top of the legs 36 of a typical person, the thighs 22 begin. The front-to-back length A can range from about 12.4 cm for a four year old child to about 21 cm for a large adult. For an average adult length A would typically be about 18–20 cm.

In the preferred embodiment of this invention, the substantially planar extent of first support surface 64 and the substantially planar extent of second support surface 72 are joined along a common edge 80, as illustrated in Figures 8 and 9. In the preferred embodiment,

common edge 80 has a rounded profile that is approximately 12 cm radius.

A chair 82 constructed with seat 62 of this invention is illustrated in Figure 10. The chair 82 can include armrests 84, 86 and a backrest 88, which can be attached to a suitable frame 90, all as is well known to those skilled in the art. In general, the chair 82 can support the seat 62 in any manner known to those skilled in the art; for the chair 82 illustrated in Figure 10, the seat 62 is supported by the frame 90. So that the seat 62 supports the downward load of the trunk 24 at the sit bones 42 from below (i.e., so that the trunk of the body does not slide forward under gravity), the substantially planar extent of first support surface 64 of seat 62 is disposed within the chair 82 (by the frame 90 for the chair 82 illustrated in Figure 10) in a plane 68 that is substantially horizontal when the chair is resting on a surface, such as a floor, for example.

Figure 10 shows a chair 82 providing for well-distributed support and weight bearing under the buttocks 66 and the thighs 22, but allows the feet 52 of a person 10 to carry some of the weight when resting on surface 70 (see Figure 7). The first support surface 64 is disposed within the chair 82 (by the frame 90 for the chair illustrated in Figure 10) at a height B above the floor 70 so that person 10 can sit in the chair with feet 52 resting squarely on the floor 70, but allowing second support surface 72 to provide for independent support to the thighs 22. In the preferred embodiment, height B is the lesser of approximately one-third of a person's standing height and the length of a person's legs 36 as measured from the floor 70 to a height slightly above the knees 56 (shown in Figure 1). Height B can range from about 35 cm for a four year old child to about 65 cm for a tall adult. For an average adult height B would typically be in the range of about 55–60 cm. A typical chair for an adult using the seat 62 described herein, and constructed according the measurements provided, generally has the first support surface 64 at a higher elevation than the supporting surface of a conventional seat (for example, seat 20, in Figure 2). The higher elevation provides for well distributed but independent support for the sit bones 42 and the thighs 22 of the person

10, yet allows the feet 52 to squarely rest on the floor 70 (see Figure 7) to provide some support. In particular, however, the substantially horizontal first support surface 64 distributes the vertical load of the trunk 24 of the person 10 across the area of the buttocks 66 to provide independent support for the sit bones 42 (which will assume the majority of the load), and the second support surface 72 provides independent support for the person's thighs 22. Further, by having the first support surface 64 extending substantially horizontal, the trunk 24 of the person 10 does not slide forward under gravity as found in existing tilt chairs. This relieves extra muscle activity by the legs 36 and the feet 52 of the person 10, increasing comfort.

Moreover, since the first support surface 64 of the seat 62 is at a higher elevation than the supporting surface of a conventional chair, a chair constructed according to this invention is easier to get in and out of.

As can be appreciated from the above description, this invention lends itself to a method of constructing a chair using the seat 62 that can be custom-made to specific people. The method would comprise obtaining certain measurements from the person and using those measurements to select and arrange the support surfaces 64 and 72, respectively, in the chair. In particular, the first support surface 64 for the seat 62 would be selected—including customized construction of the support surface, if necessary—having a sufficient perimetrical extent to extend under and support the buttocks 66 of the person 10 for whom the chair is to be constructed for, as would be known to those skilled in the art. The perimetrical extent of the second support surface 72 should be sufficient to extend under and support the thighs 22 of the person 10. The front-to-back length A of the second support surface 72, however, should not interfere with the bending of the legs at the knees 56, ie., the leading edge 76 of the second support surface 72 should be located just behind the knees 56 of the person 10, as illustrated in Figure 7. The measurement for the front-to-back length of the second support surface 72 can be obtained by measuring the length of the hand 78 of the person 10 from the wrist to the ends of the fingers, as best illustrated in Figure 1, and

described above. Once a suitable measurement for the front-to-back length A is obtained, the second support surface 74 can be selected, including customized construction of the surface, if necessary. The appropriately selected or constructed support surfaces 64 and 72 can be formed or joined as a single unit (see seat 62 illustrated in Figure 8, for example), or maintained separate (see, for example, seat 62 as illustrated in Figure 11 and 13), as dictated by the design considerations of the chair being constructed.

A measurement is obtained for the height B of the first support surface above a surface, such as a floor, for example. The height should be sufficient to allow a person to sit in the chair with the feet resting on the floor and the second support surface providing independent support to the thighs. In the preferred embodiment this height is measured from person 10 and is the lesser of approximately one-third of the person's standing height and the length of a person's legs measured from the floor 70 to a height slightly above the knees 56, as shown in Figure 1. Once the height B is determined the first support surface is disposed in the chair (held by, for example, the frame 90 as illustrated in Figure 10).

To allow the thighs to drop into an open-angle position creating an angle with the trunk 24 of the person's body that is greater than 90°, the substantially planar extent of the second support surface is positioned substantially forwardly and downwardly in relation to the substantially planar extent of the first support surface. In particular, the second support surface is angled downwardly by an amount ranging from about 10° to about 30°, and, in the preferred embodiment, by an angle of about 20°. How seat 62, and particularly the first support surface 64 and the second support surface 72 are secured to or in the chair is within the purview of those skilled in the art.

A chair custom-made for an individual in accordance with the above description can have therapeutic benefits, particularly for children with cerebral palsy, or for the elderly. Further, the chair can be custom-made for various sizes of children, improving posture, and, as a

consequence, can improve the study habits of certain children. Professionals who sit for extended periods of time, such as musicians, dentists, surgeons, lawyers, computer operators, and assembly workers can also benefit from the seat of this invention. However it is to be appreciated that the seat of this invention can be used for a variety of purposes including chairs for the home, and even for seats found in certain automobiles, trucks, or buses.

Various alternative embodiments for the seat of this invention are illustrated in Figures 11–16. All feature a first support surface 64 that is disposed in a plane substantially horizontal and having a sufficient extent to extend under a person's buttocks to support the downward load of the trunk at the sit bones, and a second support surface 72 having a substantially planar extent disposed substantially forwardly and downwardly in relation to the substantially planar extent of the first support surface 64. Again, the second support surface is angled downwardly in relation to the first support surface by an amount ranging from about 10° to about 30°, and, in the preferred embodiment, by an angle of about 20°. Further, the second support surface has a sufficient extent to extend under and support the person's thighs.

In particular, the embodiment of the seat of this invention illustrated in Figures 11 and 12 has a gap 92 in place of the common edge 80 of the seat 62 as illustrated in Figures 7–9. By using a gap construction of a chair can be simplified.

Figure 13 shows an alternative embodiment wherein the second support surface 72 is divided into two separate support surfaces 94 and 96. In this embodiment, the separate support surfaces 94, 96 provide separate support to the thighs 22 of the person 10, and can be individually spring-biased (not shown).

The alternative embodiment of the seat of this invention illustrated in Figure 14 is identical to the embodiment shown in Figures 7–9, with the exception of the addition of a cushion 98, provided over the upper surfaces of the first support surface 64 and the second support surface 72, to provide for additional comfort to a sitting person.

Figures 15 and 16 show alternative embodiments of the seat of this invention featuring additional contouring to the perimetrical extent of the first support surface 64 and the second support surface 72 that could increase comfort of the seat for certain people.

Sub. A1

The seat 62 can include a pommel 100, as illustrated in Figures 17–20. In the preferred embodiment, the pommel 100 extends upwardly from the second support surface 72. The pommel 100 provides support for the inner surface of the thighs 22 of the person 10 when sitting, see Figure 20. The pommel 100 can also provide lateral stability to the person 10 when reaching or shifting from a sitting position on the seat 62. In the preferred embodiment of this invention the pommel 100 is provided on the second support surface 72 and extends upwardly and outwardly from such support by a distance sufficient so that its sides support the inner surfaces of the thighs 22. Preferably, the pommel 100 should fit snug between the thighs 22 of the person 10, but be sized so as not to cause excessive spreading of the legs 36, as shown in Figure 20. The pommel 100 can be provided in a variety of shapes and configurations, as illustrated by the various embodiments shown in Figures 21 and 22, Figures 23 and 24, and Figures 25 and 26, and all as would be apparent to those skilled in the art upon reading this disclosure, without departing from the scope of this invention.

It can be appreciated that variations to this invention would be readily apparent to those skilled in the art, and all such variations are intended to be included in this invention. The embodiments given herein are by way of non-limiting example only, and reference should be made to the appended claims for the full scope of the invention.